

REMARKS

This request for reconsideration is filed in response to the Office Action dated February 1, 2011. For the following reasons this application should be allowed and the case passed to issue.

Claims 15-27 are pending in this application. Claims 15-27 have been rejected. Claims 1-14 were previously canceled.

Claim Rejections Under 35 U.S.C. § 103

Claims 15-23 and 25-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. (US 6,455,179) in view of Tanaka et al. (U.S. Pat. No. 6,803,142) and Iwamura (US 6,400,122). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 15, is a fuel cell assembly mounted in a vehicle comprising a fuel cell stack comprising plural fuel cells stacked in a fixed direction and a pair of end plates which are stacked on both ends of the plural fuel cells. A stacking bolt penetrates the pair of end plates in the fixed direction and maintains the plural fuel cells in a stacked state. A case houses the fuel cell stack, and a bolt penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack.

Another aspect of the invention, per claim 18, is a fuel cell assembly mounted in a vehicle comprising a fuel cell stack comprising plural fuel cells stacked in a fixed direction. A stacking bolt is disposed along the fixed direction to maintain the plural fuel cells in a stacked state. A fluid supply/discharge block is fitted to an end of the fuel cell stack to supply fluid from

outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to outside. A case houses the fuel cell stack and the fluid supply/discharge block, and a bolt penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack.

Sugita et al., Tanaka et al., and Iwamura, whether taken in combination, or taken alone, do not suggest the claimed fuel cell assemblies because the cited references do not disclose a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, a case housing the fuel cell stack, and a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15; and a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt disposed along the fixed direction to maintain the plural fuel cells in a stacked state, a fluid supply/discharge block, a case housing the fuel cell stack and the fluid supply/discharge block, and a bolt which penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18.

The fuel cell assemblies of claims 15 and 18 improve the supporting structure of a vehicle-mounted fuel cell stack by firstly providing a stacking bolt to bear the load exerted in the fixed direction by the fuel cell stack and secondly providing a bolt that penetrates the end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction by the fuel cell

stack. This arrangement of the bolt causes the load exerted in the fixed direction by the fuel cell stack to be distributed over the entire length of the bolt, thereby achieving an improved supporting structure of a vehicle-mounted fuel cell stack.

The Examiner erroneously found that bolt of Sugita et al. in view of Tanaka et al. and Iwamura is the same as the claimed bolt. As explained herein, such a finding can only be arrived at by hindsight reconstruction of the claimed invention using Applicant's disclosure as a roadmap.

In the device of Sugita et al., the bolt shown in Fig. 2 (near the reference sign 162a(b)) is fixed only to a bottom the end plate 24 and does not penetrate the end plate 24 in a direction perpendicular to the fixed direction.

In the device of Tanaka et al., similarly, the bolt 104 is fixed only to a bottom of the end plate 62 (cf. Fig. 3) and does not penetrate the end plate 62 in a direction perpendicular to the fixed direction.

Iwamura shows a through bolt 27 penetrating a case 9 accommodating a plurality of batteries 1. However, the battery 1 is very different from a fuel cell. Further, the batteries 1 shown in Fig. 3 of Iwamura are arranged with a gap. Providing that this direction corresponds to the fixed direction defined in claims 15 and 18, it is clear that no load is exerted on the through bolt 27 in the fixed direction by the batteries 1. Hence, the through bolt 27 of Iwamura does not function to bear a load exerted in the fixed direction by the fuel cell stack, as required by claims 15 and 18.

A bolt that penetrates the end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, according to the claim 15 or 18, is not

disclosed or suggested in any of the cited references.

Claim 15 defines a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. According to claim 15, the end plate is one of the pair of end plates which are stacked on both ends of the plural fuel cells.

Claim 18 defines a bolt which penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. According to claim 18, the fluid supply/discharge block is fitted to an end of the fuel cell stack to supply fluid from outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to a case housing the fuel cell stack and the fluid supply/discharge block

According to the Examiner, Sugita et al. teach bolts within the brackets that are perpendicular to the fixed direction of the fuel cell stack (170a in Figure 2). The bolt 170a of Sugita et al. penetrates the attachment plate 31, the rubber mount 168, and the bracket section 160a of the mounting mechanism 30 and a nut 174 is secured on the protrusion part thereof (Figure 2, col. 6, line 64 through col. 7, line10).

It is clear that the bolt 170a of Sugita et al. does not penetrate the end plate, nor does it penetrate the fluid supply/discharge block. Further, an end of the bolt 170a of Sugita et al. is fixed to the attachment plate 31 and another end thereof is fixed to the bracket section 160a. The bracket section may be regarded as a part of a case, but the attachment plate 31 is a part of a vehicle (col. 3, lines 27-29). Unlike the bolt 170a of Sugita et al. the bolt according to claims 15 and 18 has both ends that are fixed to the case. The bolt 170a of Sugita et al. is therefore not

comparable to the bolt as defined in claims 15 and 18. Tanaka et al. and Iwamura do not cure these deficiencies of Sugita et al.

The present invention is further distinguishable from any combination of Iwamura with the other cited references because combining Iwamura with Sugita et al. and Tanaka et al., even if it were obvious to do so, and Applicant maintains it is not, would not result in the claimed fuel cell assembly structure.

Iwamura does not disclose the stacking direction:

The batteries 1 of Iwamura are not stacked like the fuel cells of the present invention, and therefore, Iwamura does not define a stacking direction. Rather, the batteries of Iwamura are held in place by circular recesses in the supports 2, 3. Hence it is not possible to specify a stacking direction in Iwamura. The fixed direction in claims 15 and 18 is defined by the stacking direction of the fuel cells. If there is no defined stacking direction it is not possible to arrange the bolt to penetrate an end plate or fluid supply/discharge block in a **direction perpendicular to the fixed direction**, or the stacking direction, as in claims 15 and 18.

Iwamura does not disclose both ends of the bolt are located on the exterior of the case:

Further, Iwamura does not disclose that bolt 27 penetrates the stacked casing 8, 9 such that both ends of the bolt are located on the exterior of the of the case, as required by claims 15 and 18. There is no disclosure or figure showing both ends of bolt 27 are located on the exterior of casings 8, 9 to support the fuel cell stack to the casings 8, 9.

Iwamura does not disclose both claimed bolts:

Furthermore, the Examiner does not specify which bolt is the stacking bolt in Iwamura. If the bolt 27 of Iwamura corresponds to the bolt which penetrates an end plate or fluid supply/discharge block of claims 15 or 18, respectively, there must be a stacking bolt that is perpendicular to the bolt 27. Iwamura, however, does not disclose or suggest such a stacking bolt.

The Examiner found, "Iwamura further teaches a through bolt 27 passing through the casing (9), which serves as an endplate because it is located at the end of the row batteries and holds them in a row" (Office Action, page 6, lines 10-13). The bolts 27, however, do not hold the batteries in a row. As clearly shown in Figs. 2 and 3, the batteries are held in rows by the recess in the supports 2, 3.

While the Examiner might consider the batteries 1 of Iwamura shown in FIG. 6 are stacked horizontally and the members 9 serve as the end plates as a result of the bolts 27 penetrating each of the members 9, this interpretation of Iwamura would not suggest the claimed fuel cell structure, because there is **no stacking bolt** in Iwamura, which penetrates the pair of end plates or fluid supply/discharge block in the fixed direction and maintains the plural fuel cells in a stacked state.

The present claims require both a **stacking bolt** in the fixed direction and a **bolt** which penetrates an end plate or fluid supply/discharge block in a **direction perpendicular to the fixed direction, wherein both ends** of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. No combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates an end plate or fluid supply/discharge block.

It is readily apparent that the Examiner's basis for concluding that it would have been obvious to combine the cited references in the manner asserted is rooted in impermissible hindsight reasoning in view of Applicant's disclosure.

Hindsight reasoning:

In addition to the impermissible hindsight reasoning employed in combining Iwamura with Sugita et al. and Tanaka et al., impermissible hindsight reasoning was also used in combining Tanaka et al. with Sugita et al. The Examiner noted that Tanaka et al. teach that mounts (123, 130) give the housing structure that allows it to withstand the load concentration on the mount. The Examiner then reaches an unsupported conclusion that it would be desirable for the bolts of Sugita et al. to penetrate the supply block instead of a bracket since it would provide more support for the fuel cell system by changing the load concentration, as Tanaka et al. teach the importance of load concentration (page 5 of Office Action). The Examiner's position is totally unsupported by the references. Tanaka et al. discuss positioning a reinforcement member (300) about a mount (82) to reduce the load concentration on the mount (82). There is no suggestion at all in Tanaka et al. of bolts penetrating the fluid supply/discharge block.

Therefore, neither Sugita et al., Tanaka et al., nor Iwamura disclose a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15 or 18.

Response to Arguments

In the Response to Arguments section, the Examiner maintained that impermissible hindsight reasoning was not used because only knowledge that was within the level of ordinary

skill at the time the invention was made. Applicant disagrees. As explained above, one of ordinary skill cannot achieve the claimed configuration based on the prior art disclosures because no combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates the end plate or fluid supply/discharge block. Therefore, Applicant's own disclosure must have been relied on to reconstruct the claimed fuel cell assemblies.

The Examiner also maintained that Sugita et al. and Tanaka et al. are analogous references. Unlike the present invention, Sugita et al., and Tanaka et al., Iwamura is not directed to a fuel cell stack, but rather, to a group of cylindrical batteries. Furthermore, Iwamura is not reasonably pertinent to improving the supporting structure of a vehicle-mounted fuel cell stack. The Examiner defines the field of endeavor as "housing structures." The Examiner's definition is unreasonably broad, as "housing structures" would apply to any container, box, bag, enclosure, etc. One of skill in this art would not consider every possible housing structure. Rather, one of ordinary skill would consider housing structures that were reasonably pertinent to housing a fuel cell stack. For example, as shown in Sugita et al. and Tanaka et al. fuel cell stacks comprise a series of substantially parallel plates in tight, physical contact with each immediately adjacent plate, and stacked together in a stacking direction. Iwamura, on the other hand teaches a container holding a plurality of self-contained, cylindrical enclosures. There is no requirement that the cylinders in Iwamura be held in tight, physical contact with each immediately adjacent plate. Because each individual cylinder in Iwamura is sealed, it is not necessary that the cylinders be in tight, physical contact. In fact, Figs. 1 and 2 of the Iwamura show that immediately adjacent cylinders are not in physical contact. Therefore, it is readily apparent that the problems facing one of ordinary skill in the art of fuel cells, such as maintaining the integrity

of a fuel cell stack, would be of no concern to Iwamura, and are not addressed by the disclosure of Iwamura.

As made clear in USPTO 2010 *KSR* Examination Guidelines Update, when substituting one known prior art element from a different field of endeavor for another known prior art element it is necessary to consider the problem being solved. Iwamura, which is directed to a housing for a plurality of batteries, not a housing of fuel cell stack, is not concerned at all with maintaining the substantially parallel plates of a fuel cell stack in tight, physical contact.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 22006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Sugita et al., Tanaka et al., or Iwamura to modify the fuel cell assembly of Sugita et al. so that it includes a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15; or a stacking bolt disposed along a fixed direction to maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18, nor does common sense dictate such modifications. The

Examiner has not provided any evidence that there would be any obvious benefit in making such modifications of Sugita et al., rather there appear to many shortcomings to the asserted modifications, as explained above. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. ____ (No. 04-1350, April 30, 2007) at 20.

The **only** teaching of the claimed fuel cell assemblies is found in Applicant's disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. in view of Tanaka et al. and Iwamura, and further in view of Groppe (US 3,856,573). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The combination of Groppe with Sugita et al., Tanaka et al., and Iwamura does not suggest the claimed fuel cell assemblies because Groppe does not cure the deficiencies of Sugita et al., Tanaka et al., and Iwamura. Groppe does not suggest a stacking bolt disposed along a fixed direction to maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18.

The dependent claims are allowable for at least the same reasons as the independent claims from which they depend and further distinguish the claimed fuel cell assemblies. For example, the cited references do not suggest the claimed fuel cell assembly further comprising a spring interposed between the front end plate and the fluid supply/discharge block, as required by claim 27.

Application No.: 10/656,227

In view of the above remarks, Applicant submits that this application should be allowed and the case passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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